

REMARKS

By this response, claims 1-8 have been amended, and new claims 10-20 have been added, leaving claims 1-20 pending. The specification has also been amended to correct minor informalities. Applicants submit that no new matter has been added to the application by the amendments.

Reconsideration and reexamination are respectfully requested in light of the following remarks.

Allowable Subject Matter

Applicants gratefully acknowledge the indication in the Office Action that claim 2 contains allowable subject matter. For the following reasons, however, Applicants submit that all pending claims are allowable.

Objection to Specification

The Office Action objects to the specification for informalities. The specification has been amended to address the specific informalities indicated in the Office Action, as well as other informalities.

Withdrawal of the objection is respectfully requested.

Objection to Claims

The Office Action objects to claim 5. Claim 5 has been amended to clarify the recited features, as suggested in the Office Action.

Withdrawal of the objection is respectfully requested.

Rejection Under 35 U.S.C. § 102

Claims 1, 4 and 6-9 stand rejected under 35 U.S.C. § 102(e) over U.S. Patent No. 6,701,615 to Harding et al. ("Harding"). The rejection is respectfully traversed.

Claim 1, as amended, recites, a method of detecting and quantifying subsurface defects in an article made of high strength non-magnetisable materials after using the article in a high temperature environment, the article exhibiting a crack on a surface." The method comprises "a) brazing the crack; and (b) detecting and quantifying by means of a multi-frequency scanning eddy current system any subsurface cracks that remain beneath the brazed crack after the brazing" (emphasis added).

The method recited in claim 1 can be used to detect and quantify subsurface cracks that remain after repairing a surface crack by brazing, where the brazing did not fill the crack up to the bottom of the crack. As a result, one or more subsurface cracks remain beneath the braze material at the surface of the article. A "surface crack" is a crack that initiates at a surface. A "subsurface crack" is a crack within the article, but with no outlet to the surface.

For example, Fig. 2 shows a surface crack 8 prior to brazing, and Fig. 3 shows the crack after brazing. As shown in Fig. 3, brazing material 9 does not fill the entire crack, thereby leaving a subsurface crack 10 within the article. See the description at page 5, first full paragraph of the specification. The claimed method can be used to detect and quantify such subsurface cracks.

Harding fails to disclose the method recited in claim 1. Particularly, Harding discloses a method and an inspection and sorting system 100 for part repair. The system shown in Fig. 1 for inspecting the part 10 includes a sensor 30. Harding

discloses that the sensor 30 can measure “dimensions, and number, location, and size of flaws in part, such as cracks” (column 3, lines 39-41). Applicants submit that Harding does not explicitly disclose what type of “crack” is detected by the sensor. Harding does, however, disclose the use of fluorescent penetrant inspection (FPI) for detecting cracks in the part (column 6, lines 19-43). FPI uses a liquid fluorescent penetrant (FP). However, such FPI technique is only applicable to detecting surface cracks, and not to detecting subsurface cracks, which have no outlet to the surface.

Harding discloses that the system can include an eddy current inspection module 38 to obtain eddy current data for the part 10 (column 6, line 56 – column 7, line 29). However, Harding does not disclose using such eddy current inspection module to detect and quantify, by means of a multi-frequency scanning eddy current system, “subsurface cracks that remain beneath the brazed crack after the brazing,” as recited in claim 1.

The Office Action asserts that Harding discloses brazing of a crack or gap at column 10, lines 28-39. However, Harding discloses building up the part 10 by welding, such as by rebuilding of the tip, but not brazing a crack in the blade.

As evidence that those skilled in the art would have understood that Harding's disclosed “welding” is different from the claimed “brazing,” U.S. Patent No. 4,285,459 to Baladjanian et al. (“Baladjanian”), which has been applied as a reference in the Office Action and described in greater detail below, discloses that “in additions [sic], the crack may be welded prior to braze repair of an associated crack” (column 2, lines 13-15).

Harding also discloses that the part 10 can be inspected after welding (column 10, lines 44-48). However, such inspection of the welded part is clearly

unrelated to "detecting and quantifying by means of a multi-frequency scanning eddy current system any subsurface cracks that remain beneath the brazed crack after the brazing," as recited in claim 1.

The Office Action also asserts that Harding discloses brazing of a crack at column 6, lines 28-43. However, as discussed above, this portion of Harding describes the use of FPI, as well as the use a machine vision sensor to obtain FPI images of part 10 treated with the liquid FP, but not the brazing of a crack.

Accordingly, Harding fails to disclose each and every feature recited in claim 1 and thus does not anticipate this claim.

Dependent claims 4 and 6-9 are also not anticipated by Harding for at least the same reasons as those discussed with regard to claim 1.

Therefore, withdrawal of the rejection is respectfully requested.

Rejection Under 35 U.S.C. § 103

Claim 3 stands rejected under 35 U.S.C. § 103(a) over Harding in view of Baladjanian. The rejection is respectfully traversed.

Claim 3 depends from claim 1. The Office Action acknowledges that Harding fails to disclose the features of claim 3. However, it is asserted in the Office Action that Baladjanian discloses a method that is applied to blades or vanes of gas turbines made from nickel base superalloy.

Applicants submit that Baladjanian fails to cure the above-described deficiencies of Harding with regard to the method recited in claim 1. Accordingly, dependent claim 3 would not have been rendered obvious.

Therefore, withdrawal of the rejection is respectfully requested.

New Claims

Support for claims 10-13 and 17-20 is provided in Figs. 1-4 and at page 8 of the specification. Applicants submit that claims 10-20 are also patentable.

Conclusion

Therefore, allowance of the application is respectfully requested. Should the Examiner have any questions concerning this response, Applicants' undersigned representative can be reached at the telephone number given below.

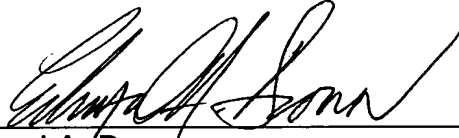
Respectfully submitted,

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2/28/05

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